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PALEONTOLOGY.—*Fossil peccary remains from the upper Pliocene of Idaho.*[1] C. LEWIS GAZIN, U. S. National Museum.

In 1934 the Smithsonian Institution expedition to southern Idaho was fortunate in securing unusually good material of the extinct peccary, *Platygonus*. These remains, together with those of a variety of other mammalian forms, were found in deposits considered to be of late Pliocene age, exposed along the west side of the Snake River near the town of Hagerman, Idaho.

Many fragmentary specimens were found at various localities in the deposits, but the most nearly complete specimens were obtained at a small quarry about 3 miles south of the *Plesippus shoshonensis* quarry (see fig. 9, p. 11, Explorations and field work of the Smithsonian Institution in 1934). The material from this locality includes an articulated skeleton of an adult animal, complete except for the left fore limb, and articulated portions of two young individuals, one of which includes the skull and lower jaws (Fig. 1).

The occurrence of *Platygonus* in the Pleistocene of North America is not rare, but remains of this form are not well known from upper Pliocene deposits and only the material from the Blanco formation (Gidley, 1903) of Texas and the Coso Mountains locality in California (Schultz, 1937) has been certainly referred to this genus. Peccary remains from the Benson locality in the San Pedro Valley of Arizona are also recognized as belonging to this genus, and certain fragmentary specimens from the Eden beds (Frick, 1921) and the upper Etchegoin deposits (Merriam, 1915) in California may possibly be *Platygonus*.

Platygonus pearcei, n. sp.

Type.—A nearly complete adult skeleton, U.S.N.M. no. 13800. Named for Mr. George B. Pearce who found the specimen designated as the type.

Locality.—T. 7 S., R. 13 E., about 3 miles south of Plesippus quarry, near Hagerman, Idaho.

Horizon.—Hagerman lake beds.

[1] Published by permission of the Secretary, Smithsonian Institution. Received November 11, 1937.

Specific characters.—Size of skull slightly less than that of *Platygonus cumberlandensis*. Rostrum of skull elongate and slender. Cranium short.

FIG. 1.—*Platygonus pearcei*, n. sp. Articulated skeletons prepared for exhibition as they occurred in the matrix. The adult skeleton, U.S.N.M. no. 13800, is the type of the species. About 13/100 natural size.

Articulation with lower jaw very low with respect to basicranium. No anteroventral projection or keel along symphysis of lower jaws. I_3 present.

Upper and lower canines slender. Cingula and accessory cuspules not strongly developed on cheek teeth. Inner and outer cusps of transverse lophs on molars more distinct than in *Platygonus cumberlandensis*. Heel or third lobe on M^3 and M_3 strong and simple. Third and fourth metacarpals not fused. Third and fourth metatarsals generally fused but not to the extent seen in *Platygonus cumberlandensis*.

Description of skull.—Species of *Platygonus* show considerable variation between individuals in proportions and characters of the skull, as observed in the material of *Platygonus cumberlandensis* from Maryland (Gidley, 1920; Gidley and Gazin, 1938) and as noted by Williston (1894, p. 23) in the *Platygonus leptorhinus* material. The skull of *Platygonus pearcei* is distinctly larger than those of *Platygonus leptorhinus* or *P. compressus* (LeConte, 1848 and Leidy, 1853), and is only slightly smaller though noticeably less robust than in *P. cumberlandensis*.

The skull of *P. pearcei*, U.S.N.M. no. 13800 (Figs. 2a and 2b) is of an advanced adult with well worn teeth and a slender, elongate rostrum, resembling specimens of *P. cumberlandensis* that have been regarded as female. The palatal surface is narrow and elongate though noticeably distorted by crushing. It is more distinctly concave between the canines than in *P. cumberlandensis* and extends considerably behind the last molar. The latter character is probably not significant, however, as the extent of the palate behind the dentition varies greatly in *P. cumberlandensis*.

The cranial portion appears relatively short by comparison with *P. cumberlandensis* and the temporal ridges converge more abruptly to the sagittal crest. The occiput is almost as high above the condyles as in *P. cumberlandensis* but the glenoid surfaces are placed below the orbits a distance equal to that in the more robust skulls of *P. cumberlandensis*. The development of the jugal below the orbit is comparable to that in fully mature female skulls of the Maryland form.

As compared with a skull (Am. Mus. no. 10388) of *Platygonus leptorhinus*, that of *P. pearcei* is considerably more elongate with a much deeper zygoma and a deeper occiput and cranium. The elongate rostrum may be shallower and perhaps narrower, although the width has been much reduced through crushing. The frontal area appears more convex and the glenoid surface is placed noticeably lower with respect to the condyles or basicranium. Also, the ridge or expansion along the lower margin of the jugal is carried farther forward on the rostrum than in *P. leptorhinus*, but not so markedly as in male specimens of *P. cumberlandensis*. Moreover, the occipital area is not so widely expanded dorsally with the lateral margins more nearly parallel.

The basicranial region is not well preserved in the skull of *P. pearcei*. The cancellous bullae are nearly obliterated and the basisphenoid and basioccipital are damaged. The basisphenoid in skulls of *Platygonus* are directed abruptly upward from the basioccipital in a nearly vertical direction as contrasted with the gentler slope of this element in the living peccaries. The external audital tube extends posterodorsally and slightly outward in a groove in the ascending wing of the squamosal. The posterior process of the tympanic overlaps to a marked extent the posterior surface of the squamosal and is firmly fused medially and posteriorly with the exoccipital.

As in recent peccaries, *Platygonus* possesses a foramen that opens ventrally in a position corresponding to that normally occupied by the postglenoid foramen. Dorsally the foramen opens anteroexternal and adjacent to the external auditory meatus. According to Van Kampen (1905), Pearson (1923), and others this foramen is not the postglenoid, although Rusconi

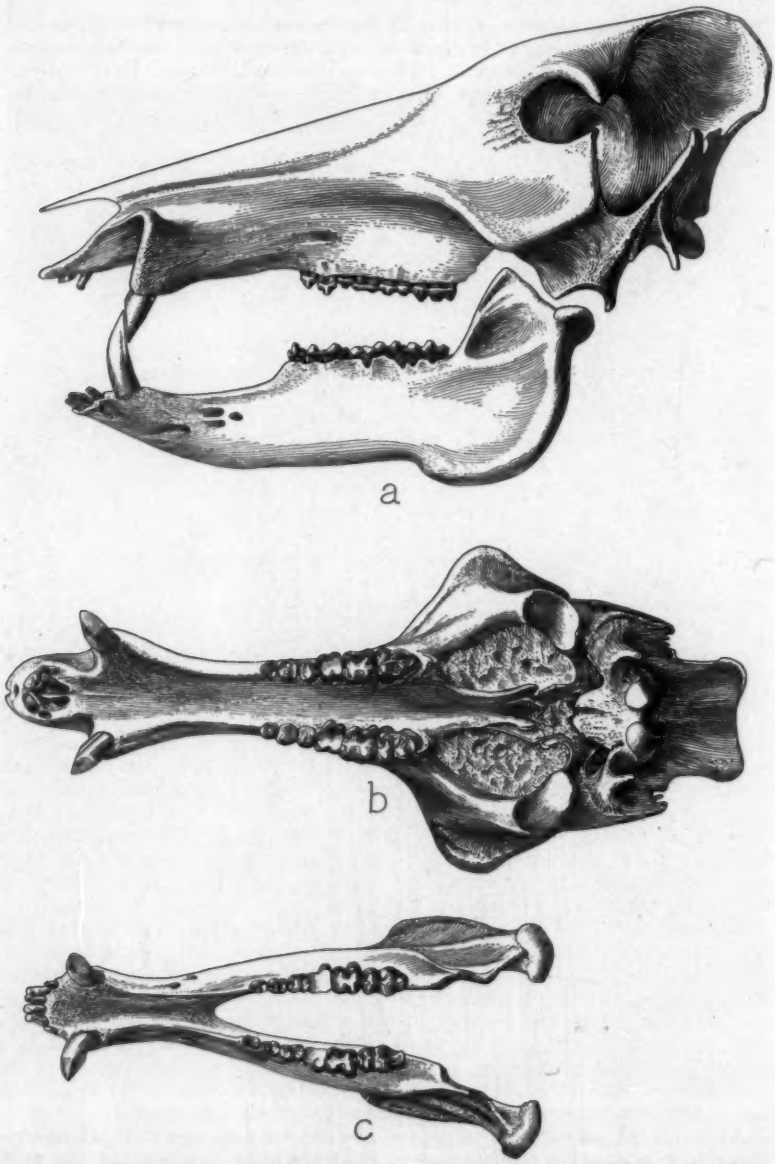

FIG. 2.—*Platygonus pearcei*, n. sp. Skull and mandible, type specimen, U.S.N.M. no. 13800; a, lateral view of skull and mandible; b, ventral view of skull; c, dorsal view of mandible. 3/10 natural size. Upper Pliocene, Hagerman, Idaho. Drawing by Sydney Prentice.

(1929) so regards it. The venous sytem communicating with the inner and outer portion of the cranium along the base of the tentorial plate drains ventrally through a small foramen or fissure between the margins of the alisphenoid and squamosal, lateral to the foramen ovale and adjacent to the bulla. This opening is conspicuous on the skull of *Platygonus pearcei* and its position is equivalent to that in *Pecari angulatus*. Functionally it more nearly corresponds to the postglenoid foramen.

The petrosal, which was found in position in the right side of the cranium, is noticeably larger than in living forms. When viewed from above and medially the most conspicuous feature is the prominent anterodorsal projection which joins the tentorial plate, although it does not fuse with it. In *Pecari* and *Tayassu* this process is much less developed. The hiatus facialis lies in the deep angular excavation formed between this process and the anteroventral apex. The floccular fossa, posterodorsal to the internal auditory meatus is also larger and much better defined. The prominence (eminentia arcuata) just below the floccular fossa, covering medially the aqueductus vestibuli, is well developed and is connected by a broad ridge with the process joining the tentorial plate. The slit-like aperture of the aqueductus cochleae is directly below the internal auditory meatus, on the lower margin of the petrosal.

In ventrolateral view of the petrosal the promontorium is no larger than in recent peccaries, and the fenestrae are similar in form and position. The fossa tensoris tympani is larger and the facial sulcus is larger and relatively deeper. Directly above the fenestra ovalis on the crista facialis is a clearly defined impression occupied by the crus breve of the incus. The incus was preserved although the other auditory ossicles were not found. This element is about one half larger than in *Pecari angulatus*, but is otherwise similar. A particularly noticeable feature in a lateral view of the petrosal is a conical prominence projecting nearly vertical from the dorsolateral portion of the bone, separate from the remaining slight mastoid portion. It rises from above the fossa for the tensor tympani, about over the ampula for the lateral and dorsal semicircular canals, and projects into an impression apparently in the squamosal. In *Pecari* the low ridge representing the mastoid portion does not exhibit the conical projection. In *Tayassu* this portion of the periodic is even less developed.

Mandible.—The mandible, no. 13800 (Figs. 2a and 2c) of *P. pearcei* shows the elongate anterior portion characterizing the skull. The length of the diastema between the canine and cheek teeth is nearly as great as in the longest of the *P. cumberlandensis* jaws. However, a second mandible, no. 13798 (Fig. 3), of a young adult *P. pearcei* exhibits a somewhat shorter diastema than in any of the *P. cumberlandensis* jaws with an adult dentition. The difference is probably not greater than might be attributed to the difference between an advanced adult female and a young male, as suggested by the *P. cumberlandensis* material. The elongate symphysial portion appears more procumbent than in *P. cumberlandensis* or *P. leptorhinus*, due in a large measure to the absence of the pronounced anteroventral projection or keel along the symphysis in this species. The lower surface of the symphysial portion is evenly rounded transversely. The depth of the mandible below the cheek teeth is noticeably great in no. 13800; this is variable in the Cumberland form. The lower portion of the angle does not flare outward so markedly as in either *P. cumberlandensis* or the specimen of *P. leptorhinus* (Amer. Mus. no. 10388). The margin of the angle is evenly curved and does not extend posteriorly with reference to the condyle as much as in *P.*

cumberlandensis. The anterior surface of the coronoid process is distinctly broader than in *P. cumberlandensis* and the apex is more acute. In *P. cumberlandensis* the apex of the coronoid is broad anteroposteriorly with a more pronounced dorsoposterior projection. The distance between the third molar and the condyle is greater in *P. pearcei* than in *P. leptorhinus*.

Dentition.—An important character in the dentition is seen in the persistence of the third lower incisor, characteristically absent in the Pleistocene species, although a small vestige of an alveolus for it was seen in one side of one of the lower jaws of *P. cumberlandensis*. Six lower jaws of *P. pearcei* have this portion preserved and show this tooth to be present and moderately developed. Its presence was also noted in the Coso Mountains material.

FIG. 3.—*Platygonus pearcei*, n. sp. Mandible, U.S.N.M. no. 13798, occlusal view showing cheek teeth of left ramus. 3/5 natural size. Upper Pliocene, Hagerman, Idaho. Drawing by Sydney Prentice.

The remaining incisors, upper and lower, show no important differences from those in the Pleistocene form. The canines are slenderer than in either *P. cumberlandensis* or *P. leptorhinus*. The upper and lower cheek teeth are somewhat smaller than the average in *P. cumberlandensis*, though larger than in *P. leptorhinus*, and are similar to those in *P. cumberlandensis* in the development of the transverse lophs, but with a slightly greater separation of the inner and outer cusps, more noticeable in the third molars. The cheek teeth exhibit fewer accessory cuspules than in the Cumberland form and the cingula are less prominent, particularly in the upper teeth. The third lobe of M_3 is a large but simple cusp, not showing the incipient cusps on either side usually present in *P. cumberlandensis*.

The cheek teeth in no. 13800 from Hagerman are smaller than those in the isolated jaws, no. 13798. A similar difference in size of the teeth, particularly in the robustness of the premolars was noted between specimens of *P. cumberlandensis*, sorted according to sex as presumed from the development of the zygomae. The larger premolars are generally associated with a shorter diastema and a more rugged, flaring development of jugal.

The heel of M_3 in *P. pearcei* is quite unlike that figured by Cope (1893, pl. 13, fig. 5) for *Platygonus bicalcaratus* of the Blanco formation of Texas. The tooth fragment described by Cope is much smaller, and relatively narrower through the portion considered as the second or posterior crest, moreover, the heel is made up of several relatively small cusps. The anterior portion of the Texas tooth is missing, this fact together with the character of the preserved portion strongly suggests that the fragment represents an

incomplete P_3 or P_4 rather than M_3. The heel portion of lower premolars in *Platygonus* is highly variable in character, and may be represented by a prominent portion of the cingulum to a heel fully as developed as that in the above tooth.

TABLE 1.—MEASUREMENTS OF SKULL AND MANDIBLE OF *Platygonus pearcei*

	U.S.N.M. no. 13800	U.S.N.M. no. 13798
Skull:		
Length of skull from premaxillae to top of occipital crest	396 mm	
Length of skull from premaxillae to occipital condyles	350*	
Distance from anterior extremity of premaxilla to postglenoid process	300*	
Distance from anterior extremity of premaxilla to postorbital process of frontal (oblique)	320*	
Width across postorbital processes	125*	
Greatest extent of jugal below orbit	68	
Distance from lower margin of orbit to glenoid surface	77	
Distance from middle of occipital crest to center of glenoid fossa	165	
Distance from occipital crest to lower margin of condyles	128*	
Greatest width across dorsal portion of occiput	63	
Mandible:		
Length from anterior extremity of symphysis to posterior margin of condyle	277*	
Length of symphysis	103	85 mm
Distance between M_3 and posterior margin of condyle	79	
Depth of jaw below M_1 (outside)	55*	45
Greatest distance between top of coronoid process and lower margin of angle	120*	
Height of mandible from condyle to base (table top)	100*	
Distance between inner margins of canine alveoli	25	19
Dentition:		
I^1–M^3, incl.	209*	
Diastema between C and P^2	76	
P^2–M^3, incl.	82	
P^2–P^4, incl.	29.3	
M^1–M^3, incl.	54.2	
P^4, anteroposterior diameter: transverse diameter	10.2:12.8	
M^3, anteroposterior diameter: transverse diameter	23:17	21.8:17
I_1–M_3, incl.	203*	187
Diastema between C and P_3	78	54
P_3–M_3, incl.	84.5	93.6
P_3–P_4, incl.	31.2	34.2
M_1–M_3, incl.	54	59.8
P_4, anteroposterior diameter: transverse diameter	11.4: 9.9	13.1:10.3
M_3, anteroposterior diameter: transverse diameter	25.2:14.5	27.3:15.5

* Approximate.

The upper dentition which Gidley (1903, pp. 477–478, fig. 1) referred to *P. bicalcaratus* includes much larger teeth than would be associated with an M_3 of the size figured by Cope. Considering this tooth as a lower premolar no disparity in size is apparent, but the specimen as a type has little diagnostic value.

The upper teeth of *P. pearcei* do not show the well isolated cross lophs seen in the upper dentition referred to *P. bicalcaratus*. Also M^3 has a moderately

developed heel not seen in the tooth which Gidley considered to be the third upper molar of *P. bicalcaratus*. The upper dentition in the type of *P. texanus* Gidley (1903, pp. 478–481, figs. 2, 5) has somewhat larger and relatively much wider molars than *P. pearcei*. Also, the cingula are better developed than in the Idaho teeth.

Limbs.—The bones of the fore and hind limbs are for the most part about the same length as in *P. cumberlandensis*, but slenderer, with smaller, distinctly narrower articular surfaces. The trochlea of the humerus is narrower and not as deep. The distance across the condyles on the femur is less and the ridges bounding the anterior portion of the trochlear articular surface are distinctly closer together. The head of the tibia is of less diameter and the cnemial crest is less outstanding.

The metacarpals and metatarsals, in keeping with their earlier geologic age, show a less advanced stage in the fusion between the third and fourth than do those of the Cumberland Cave form. None of the metacarpals in the Idaho material were found to be co-ossified, but several pairs in the Pleistocene material are fused. In the pes the third and fourth metatarsals are united in most cases but the co-ossification does not extend so far down the shafts as in *P. cumberlandensis*.

In a few instances the second metacarpals and metatarsals were found. In the articulated skeletons these splints are seen to be about two-thirds the length of the adjacent element in the manus and, though incomplete, at least one-half the length of the third metatarsal in the pes.

Remarks.—The record of *Platygonus* prior to upper Pliocene time is very incomplete. Fragmentary specimens from the Miocene and earlier Pliocene that have been referred to this genus in most cases were found later to represent *Prosthennops*. A tooth from the middle or upper Miocene which I (1932, p. 81) referred to *Platygonus* doubtless belongs to some form of *Thinohyus* or *Desmathyus*. As pointed out by Matthew (1924, pp. 177–178) *Desmathyus* in the Miocene probably stands in a relation intermediate between *Perchoerus* and *Platygonus*, but an appreciable hiatus still remains between the known forms of *Desmathyus* and *Platygonus*.

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PALEONTOLOGY.—*An alcyonarian from the Eocene of Mississippi.*[1]

SIDNEY J. HICKSON, Cambridge, England. (Communicated by WALDO L. SCHMITT.)

Prof. J. Magruder Sullivan, of Millsaps College, Jackson, Mississippi, found in the Moody marl of the Eocene Jackson group on Town Creek in the city of Jackson a very interesting specimen representing part of the axis of an alcyonarian. As the Alcyonaria are not frequently found in fossil state it is deemed worth-while to record this occurrence.

Eogorgia sullivani Hickson, n. gen. and sp.

Figs. 1–4

Description.—This specimen is about 170 mm in length by 25 mm in diameter and is cylindrical in shape. It consists of a series of concentric laminae of a calcareous substance mixed with grit and intercalated with an irregularly disposed black substance that is insoluble in acid. The surface is scored by a number of parallel grooves, with a slight spiral twist as regards

[1] Received December 7, 1937.

the axis of the specimen. The calcareous substance is mainly amorphous, but by an examination of fragments chipped off from and between the

FIGS. 1–4.—*Eogorgia sullivani* Hickson, n. gen. and sp. 1, side view of holotype ×1. 2, cross-fracture surface, ×1. 3, spindle-shaped spicule, ×200. 4, spicular needle, ×200.

laminae two kinds of spicules have been found—*a*, long slender needles of unknown length but about 0.015 mm diameter, provided with a few short

conical tubercles; *b*, thick spindles about 0.14 mm in length by 0.07 mm in diameter, provided with numerous prominent tubercles. These spicules are not easy to find among the amorphous calcareous debris, but I have found them in several preparations.

Remarks.—I am of the opinion that there are sufficient reasons for believing that this fossil was a part of the axis of an alcyonarian belonging to the Scleraxonia division of the Order Gorgonacea. The surface grooves probably correspond with the positions in which the main nutritive canals were situated, such grooves being occasionally found on the axis of Recent Gorgonacea. The black substance probably corresponds with the horny matter (usually called "keratin") which is commonly found in the axis of Gorgonacea. The amorphous calcareous matter may have been formed in the course of time by the solution of calcareous spicules and redeposition in an amorphous form. Some of the spicules remain in an unaltered condition. The long needle-shaped spicules (*a*) agree very closely with the spicules found in the sheath of the axis of the species of the Recent genus *Iciligorgia*, belonging to the Scleraxonia. The spindle-shaped spicules are similar to some of the spicules found in the axis of *Iciligorgia orientalis* of Australian waters.

The fossil has a diameter much greater than that of the main stem of any species of *Iciligorgia* I have seen, indicating that the whole colony must have been originally of great size; but specimens of another genus of Scleraxonia, *Paragorgia* of the Norwegian fjords, have been dredged with a diameter of the stem much greater than that of this fossil.

I do not consider that we are justified in referring this fossil to the genus *Iciligorgia* or to any other genus of Recent Gorgonacea, and as a new generic name must be found I would suggest that it be called *Eogorgia sullivani*, genotype and holotype, U.S.N.M. No. 510859.

BOTANY.—*New grasses from Oregon.*[1] AGNES CHASE, Bureau of Plant Industry.

Among grasses recently received from Professor Morton E. Peck, collected by him in little known regions of Oregon, are two undescribed species. One, a species of *Pleuropogon* is of especial interest, since it has paleas awned from near the base of the keels as in the type species of the genus, *P. Sabinii* R. Br. of Arctic America, which suggested the generic name. The only other species hitherto known, *P. californicus* (Nees) Benth. and *P. refractus* (A. Gray) Benth., of the Pacific Coast of the United States, have paleas toothed only. The new species is not closely related to *P. Sabinii*, which is a low plant, with small spikelets with awnless lemmas and paleas with short dorsal

[1] Received December 8, 1937.

awns, but resembles *P. refractus*, except that the spikelets are ascending, not reflexed or drooping. Two specimens of this undescribed species were in the National Herbarium in the cover of *P. refractus*, the well-developed though inconspicuous dorsal awns of the palea having been overlooked. One of these is chosen as the type, since it shows well developed rhizomes and has longer spikelets than has Professor Peck's specimen.

The other undescribed grass is a tall, rather coarse species of *Poa* from the region of Metolius River, which forms the southern boundary of Warm Springs Indian Reservation. Professor Peck writes, in answer to my inquiries, "The *Poa*, no. 19804, is from a point remote from any Erosion Control project. It seems quite certain to me that the plant is native. I find no indications of rhizomes and feel sure there were none." In the last two years a number of Old World grasses have appeared in the United States, hence it was necessary to study the whole genus before venturing to propose a new species in so large and variable a genus as *Poa*. But careful search of species of America, North and South, and of the Old World, fails to find any showing the combination of characters found in Professor Peck's specimen.

Pleuropogon oregonus, sp. nov.

Perennis; culmi 55–90 cm alti, e rhizomatibus tenuibus, erecti; vaginae internodiis longiores, scaberulae; ligula 4–5 mm longa, subhyalina, laciniata; laminae erectae, planae, 8–18 cm longae, 4–7 mm latae, acuto-mucronatae, subscaberulae; racemus suberectus, 6–16 cm longus; pedicelli 2–12 mm longi; spiculae 6–8, adscendentes, 7–13-florae, 1.5–4 cm longae; glumae pallidae, subhyalinae, 2–4 mm longae, enerves; lemmata 5.5–7 mm longa, 3 mm lata, 7-nervia, purpurea, scabra, apice lato, hyalino; arista 6–10 mm longa, scabra; palea lemmata aequans, dorso infra medium biaristato.

Perennial with slender rhizomes with purplish-red scales and long soft internodes; culms erect, 55 to 90 cm tall, rather soft and spongy; sheaths overlapping, the lower rather loose, purplish red, nearly smooth, the others scaberulous, striate; ligule 4 to 5 mm long, white, subhyaline, lacerate; blades erect, flat, 8 to 18 cm long, 4 to 7 mm wide (the uppermost reduced), abruptly narrowed into an acute, mucronate-tipped apex, slightly scaberulous on the upper or on both surfaces; raceme suberect, the slender slightly flexuous axis 6 to 16 cm long with 6 to 8 ascending spikelets on slender pedicels 2 to 12 mm long; spikelets loosely 7- to 13-flowered, 1.5 to 4 cm long (excluding the awns); glumes pale, subhyaline, 2 to 4 mm long, nerveless, often erose; rachilla joints 2 to 3 mm long; lemmas 5.5 to 7 mm long, about 3 mm wide, strongly 7-nerved, purplish and scabrous, except at the broad hyaline pale erose summit, the midnerve extending into an erect scabrous awn 6 to 10 mm long; palea as long as the lemma subhyaline, each of the keels bearing, about one-third from the base, a slender, scabrous, erect to spreading awn, from 2 to 7 mm long, the pair of a single palea often unequal, the summit of the palea hyaline the nerves extending into delicate teeth.

Type in the U. S. National Herbarium, no. 913360, collected at Union, Oregon, June 8, 1901, by A. B. Leckenby.

FIG. 1.—*Pleuropogon oregonus*. Raceme, ×1; floret, ×5.

Only known from Oregon, two additional collections being *Peck* 19568, wet meadow, 16 miles east of Adel, Lake County, and *Cusick*, in 1886, without locality, probably Union.

Poa Peckii, sp. nov.

Perennis; culmi caespitosi, erecti, circa 100 cm alti foliosi; vaginae internodiis longiores, carinatae, scabrae; ligula firma, 0.3–0.4 mm longa; laminae firmae, planae vel conduplicatae, acuminatae, 30–45 cm longae, 3–5 mm latae, utrinque scabrae, supra sparse pilosae; panicula 17 cm longa, ramis fasciculatis, scaberrimis; spiculae subcrebrae, compressae, 3–5-florae, 5–5.5 mm longae; gluma prima lanceolata, acuminata, 2.5–2.8 mm longa; gluma secunda latior, 3–3.5 mm longa; lemmata 3.5–4 mm longa, acuminata, sub lente minutissime papillosa, basi arachnoidea, nervis mediis marginalibusque infra medium villosis, inter nervos glabra.

FIG. 2.—*Poa Peckii*. Floret and spikelet, ×20.

Perennial, without rhizomes, rather pale; culms tufted, erect, about 100 cm tall, leafy; sheaths overlapping, carinate, scabrous, the lowermost papery becoming shredded; ligule firm, 0.3 to 0.4 mm long; blades firm, flat or folded or subinvolute toward the acuminate boat-shaped tip, 30 to 45 cm long, 3 to 5 mm wide, scabrous on both surfaces and sparsely pilose, the hairs appressed, some retrorsely so toward the summit; panicle long-exserted, rhomboid-pyramidal, open, 17 cm long, the branches in distant fascicles of 3 or 4, very scabrous, naked and simple below, those of the lowest whorl 3.5 to 9.5 cm long; spikelets rather crowded on short scabrous pedicels on the short branchlets of the upper half to two-thirds of the main branches, strongly compressed, tawny, 3- to 5-flowered, 5 to 5.5 mm long; glumes acuminate, the first lanceolate, 2.5 to 2.8 mm long, the second broader, 3 to 3.5 mm long; lemmas 3.5 to 4 mm long, acuminate, under a lens very minutely papillose, copiously webbed at base, silky-villous on the lower third to half of the keel and marginal nerves, glabrous between the nerves.

Type in the U. S. National Herbarium no. 1,720,372, collected in dry woods, along Metolius River near Camp Sherman, Jefferson County, Oregon, July 11, 1937, by Morton E. Peck (no. 19804).

This species is most nearly related to *Poa occidentalis* Vasey of Colorado and New Mexico, from which it differs in the more scabrous foliage, the minute firm ligule, the longer, firmer blades, appressed-pilose on the upper

surface, the shorter, less open, more densely flowered panicle, and in the shorter lemmas, minutely papillose under a lens.

BOTANY.—*Some new snow algae from North America.*[1] ERZSÉBET KOL,[2] Szeged, Hungary. (Communicated by H. H. BARTLETT.)

During my sojourn in America in 1936 I had the opportunity to work in the laboratory of the Department of Botany of the University of Michigan, for which I am very thankful. Professor William Randolph Taylor was so kind as to give me his algal collections from British Columbia to look over. I found in these collections some interesting snow samples, but I could not study the whole collection in the short time available. The snow samples No. 38 and No. 60 contained some *Raphidonema* specimens which, to my knowledge have not previously been described from the snow fields of North America.

The snow samples which form the subject of this report were collected in 1923 and 1925. A full account of the type of country in which the collections were made will be found in Taylor's account (1928).

Sample number 38 was collected at an elevation of about 7000 feet in Eagle Pass Mountains, British Columbia, September 3, 1923, and contained the following kryobionts: *Raphidonema brevirostre* var. *canadense*, var. nov., *R. nivale* var. *taylori*, var. nov., *R. sabaudum* f. *minus*, f. nov., *Chlamydomonas nivalis* Wille?, and *Chionaster nivalis* (Bohl.) Wille. With the exception of *R. sabaudum* f. *minus* the same forms were found in sample number 60, collected at Lakes of S. Grizzly group, British Columbia, August 31, 1925.

Raphidonema brevirostre Scherffel var. *canadense*, var. nov. Figs. 1–2

Filaments short, consisting of 4–8–16–32, straight or curved with slightly pointed ends. Cells usually not as long as broad, or cylindrical, 1–1.5μ diam. and 0.8–1.5μ long. Cell wall thin. Chromatophore yellowish-green, single, a parietal plate without pyrenoid or starch.

Vegetative reproduction by cell division and by separation of the filament into two parts. The filament breaks transversely into two portions, the newly fractured ends of which eventually develop the taper characteristic of this species.

Nearly related to *R. brevirostre*, differing in the slightly smaller average dimensions.

[1] Paper No. 620 from the Herbarium and the Department of Botany of the University of Michigan. Received November 9, 1937.

[2] Holder of the International Fellowship Crusade of the American Association of University Women fellowship for the academic year 1935–36; for which the writer is deeply grateful.

In red snow; North America: British Columbia, Eagle Pass Mountains and Lakes of the S. Grizzly group, collected by Professor William Randolph Taylor.

Filamentis liberis brevibus, 4–8–16–32 cellularibus, rectis, vel leniter curvatis; apicibus breviter acuminatis. Cellulis in media parte filamenti brevibus, cylindraceis, 1–1.5μ latis et 0.8–1.5μ longis. Membranis cellularum tenuibus. Flavoviridibus chromatophoris singulis; pyrenoïdo et amylo nullo.

Multiplicatio: filamenta in duas partes aequales fragmentant, deinde genicule flectunt et vitae sempiternae in geniculiformis ultimoque cellulae apicibus tangentibus acuminant.

Differt ab *Raphidonemato brevirostri* Scherffel dimensione cellulae.

Habit: in nivibus rubris, in America: "British Columbia: Eagle Pass Mts. et Lakes S Grizzly group."

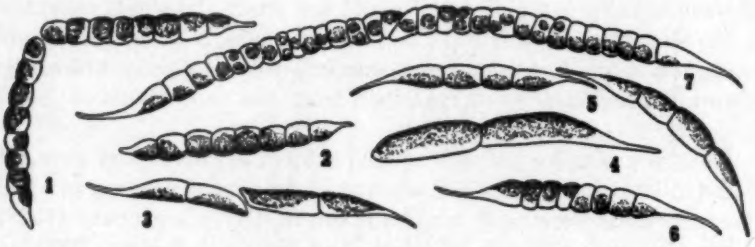

FIG. 1, 2.—*Raphidonema brevirostre* var. *canadense.* Figs. 3–5.—*Raphidonema nivale* Lagerh. var. *taylori*, separation of the filament. Figs. 6, 7.—*Raphidonema sabaudum* f. *minus.* (×3000)

R. brevirostre was collected for the first time by Professor István Györffy in Hungary in the year 1910 and was described by Professor Aladár Scherffel (1910). I found it also in Switzerland in the year 1930.

Raphidonema nivale Lagerh. var. *taylori*, var. nov. Figs. 3–5

Filaments short, consisting of 2–4 cells, straight or slightly curved, with pointed ends. Cells long cylindrical, 1–1.5μ diam. and 2–7μ long. Membrane thin, chromatophore a parietal plate without pyrenoid or starch.

Vegetative reproduction by cell division and separation of the filament. In this species the wall developed before separation is always a little oblique, and each half of the filament then develops the attenuate end characteristic of the species, these ends overlapping until separation occurs, when they slip apart.

In red snow; North America: British Columbia, Eagle Pass Mts. and Lakes of the S. Grizzly group.

Filamentis liberis brevibus, 2–4 cellularibus, rectis vel leniter curvatis, apicibus longe acuminatis. Cellulis 1–1.5μ latis et 2–7μ longis. Membranis cellularum tenuibus, achrois. Chromatophoris planis, rare marginibus lobatis; pyrenoïdo et amylo nullo.

Multiplicatio: filamentum inter 4–4 (2–2) cellules membranis oblique dispositis fragmentatum apicibusque novis filia filamenta acutiusculunt, et ad extremum ea separant.

Differt ab *Raphidonemato nivali* Lagerh.: 1. dimensione cellulae, 2. forma cellularum.

Habit: in nivibus rubris, in America: "British Columbia: Eagle Pass Mts. et Lakes S. Grizzly group."

Nominata in honorem ill. ac clarissimi Domini omnibus noti ord. botan. professoris Michiganensis: William Randolph Taylor.

This microorganism differs from *Raphidonema nivale* Lagerh. in the smaller size and in the form of the cells.

Raphidonema sabaudum Kol f. *minus*, f. nov. Figs. 6, 7

Filaments short, consisting of 8–16–32 cells, straight or variously curved, with pointed ends. Cells not as long as broad. 1–1.5μ diam. and 0.6–1.2μ long. Membrane thin, chromatophores either one or two plates, without pyrenoid.

Vegetative reproduction by cell division and by separation of the filament in two parts, the ends overlapping and developing the characteristic tapered form before separation.

Nearly related to *Raphidonema sabaudum*, differing in the slightly smaller average dimensions.

In red snow; North America: British Columbia: Eagle Pass Mts.

Filamentis liberis brevibus, tenuiter articulatis, 8–16–32 cellularibus, rectis vel curvatis; apicibus longe acuminatis respective setigeris. Cellulis in media parte filamenti: brevibus cylindraceis, 1–1.5μ latis et 0.6–1.2μ longis. Membranis cellularum tenuibus, chromatophoris in centro cellularum sedentibus, planis; pyrenoïdo et amylo nullo.

Multiplicatio: filamentum inter 4–4 cellulas membranis oblique dispositis fragmentatum apicibusque novis filia filamenti acutiusculunt, et ad extremum ea separant.

Differt ab *R. sabaudo* Kol dimensione cellulae.

Habit: in nivibus rubris, in America: "British Columbia: Eagle Pass Mts."

I found *R. sabaudum* for the first time in France on the snow-fields of Mont Blanc in 1933.

This investigation was initiated in the Department of Botany of the University of Michigan, Ann Arbor, under the direction of Professor William Randolph Taylor, for whose advice the writer is deeply grateful.

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PALEOBOTANY.—*Pleistocene fossils from Westmoreland County, Virginia.*[1]

EDWARD W. BERRY, The Johns Hopkins University.

In a short article published in 1909 the writer recorded the acorns of an unidentified species of *Quercus* and burs of *Fagus americana* from the Pleistocene (Talbot) near Nomini bluffs on the right (south) bank of the Potomac in Westmoreland County, Virginia.[2] During the past summer this outcrop was visited by my son, Charles T. Berry, and it is the purpose of the present note to discuss the material collected by him.

The locality is about 600 yards below the mouth of Popes Creek and the deposits represent what Wentworth[3] calls in Virginia the Princess Anne terrace and formation, which he regards as of essentially marine origin and extending along the shores of tidewater Virginia, where preserved, inland to the Fall-line. The Princess Anne he regards as the equivalent of the youngest Talbot of Maryland and the youngest Pamlico of North Carolina.

The material is a fine sandy or silty, bluish, ferruginous-stained, somewhat carbonaceous clay, with more or less pyritized sticks or branches up to several inches in diameter that suggest *Pinus*, but which have not been determined; and a few disseminated and angular quartz pea gravels. The deposit is interpreted as a Pleistocene bench of reworked Miocene material that abuts on the cliff section of true Miocene. The reasons for this interpretation are (1) the somewhat more silty texture noticeable in weathering and in the much more friable nature of the Pleistocene material; (2) in the fact that the latter is packed with the casts of *Rangia* to the almost total exclusion of other forms; and (3) to the uncompressed nature of the contained twigs and branches. In the Miocene, similar stem fragments are greatly compressed and molluscan remains are relatively uncommon. Finally the presence of a variety of Pleistocene plants confirms the field relations. I may say that my identification of *Rangia* has been checked by Dr. Julia A. Gardner of the U. S. Geological Survey.

[1] Received December 20, 1937.
[2] BERRY, E. W. Amer. Nat. **43**: 432–436. 1909.
[3] WENTWORTH, C. K. Va. Geol. Survey Bull. **32**. 1930.

The variety of identifiable fossils is not large and the chief interest is the association of brackish water mollusks with the aquatic plants, *Naias* and *Zannichellia*, also frequently found in brackish water, the last being the most abundant fossil and hitherto unknown from the North American Pleistocene. This locality is about 30 miles west (upstream) from the Talbot locality at Wailes Bluff, St. Mary's County, Maryland, where a very considerable marine fauna has been recorded, but is perhaps in no way remarkable since *Rangia cuneata* has been recorded[4] from Charles County, Maryland, at a locality on Nanjemoy Creek over 20 miles farther to the northwest.

The species identified are too few for purposes of correlation or ecological discussion, but are entirely similar to those found in the late Pleistocene at many localities in the Coastal Plain of the Middle and South Atlantic states, all of which is rather consistent in indicating somewhat milder climatic conditions than obtain at the present time.

Naias sp.

Fruits of *Naias* are very common and widespread at various late geological horizons, especially during the Pleistocene. They are present in the Wicomico and very abundant in the Pamlico of the District of Columbia. Pericarps are infrequent at the present locality.

Zannichellia palustris Linnaeus

This interesting aquatic monocotyledon, which in existing floras is found on all the continents except Australia, is widely distributed in ponds and streams in fresh and brackish waters. It is said to be monotypic by Ascherson although other authors (Morong) suggest that more than a single species may be represented.

The nutlets of this species are much the most abundant forms at the present locality. The majority are rather heavily spined, although some are less so, and a single example is smooth. This is the more interesting as the living specimens I have seen have fruits that are practically smooth in the eastern and spinose in the western States, but I have made no attempt to determine whether this difference extends beyond the insignificant amount of material I have examined. In any case the fossil fruits are rather more spinose than any Recent material seen.

So far as I know the present is the first record of this species from the Pleistocene of North America and I have found no fossil records from other continents except one by Holmboe[5] from Norway cited under the name *Zannichellia polycarpa* Nolte. The Virginia fossils are well shown in the accompanying illustration.

[4] CLARK, W. B. Maryland Geol. Survey. Pliocene and Pleistocene, p. 196, 1906.
[5] HOLMBOE, J. *Planterester Norske Tørvmyrer*, p. 150, pl. 1, fig. 7, 1903.

Carex sp.

A single specimen of the same size and other features as those figured from the Wicomico of the District of Columbia compared with the existing *Carex collinsii* Nuttall[6] except that the style is much shorter in the Virginia specimen, a feature which might well be due to breakage since only the single specimen was found.

FIG. 1.—*Zanichellia palustris* Linnaeus. ×3, ×6, ×7½.

Quercus sp.

The acorns and cupules of some species of oak are rather common in the deposits and were noted in 1909. As there is no certainty that they are mature and as some are obviously aborted, no attempt has been made to identify them specifically.

Phytolacca decandra Linnaeus

A characteristic seed of this species. Previously recorded by the writer from both the Wicomico and Pamlico formations of the District of Columbia and from the lower terrace of the Chattahoochee River in Alabama, and more recently by Brown[7] from Northwest Branch of the Anacostia River in Prince George's County, Maryland.

? *Vitis* sp.

No grape seeds have been discovered in the deposits, but there are several stout coiled tendrils such as have been found elsewhere associated with grape seeds and tentatively referred to this genus, e.g. from the Chowan

[6] BERRY, E. W. This JOURNAL 14: 17, pl. 1, figs. 4–8, 1924.
[7] BROWN, R. W. This JOURNAL 25: 443, 1935.

formation of North Carolina[8] and from the Pamlico formation of the District of Columbia.[9]

MOLLUSCA

Rangia cuneata (Gray) Dall

This well known species, which is said to range from the Pliocene to the Recent, is found at the present time in shallow water along the coast of the Gulf of Mexico from Alabama westward and southward to Mexico. Although occurring in both normal sea water and brackish water, it is said to find its optimum conditions in the latter. Its range reaches northward as far as Maryland in the late Pleistocene where it has been recorded not only from the lower beds on both sides of Point Lookout, but from Sparrows Point and Middle River in Baltimore County, as well as Nanjemoy Creek in Charles County.

Some of the foregoing occurrences, as well as additional localities in North Carolina are discussed by Mansfield.[10]

This species appears to be common in the silty clay below Popes Creek in Westmoreland County, Virginia, but is in a very bad state of preservation.

? *Macoma balthica* Linnaeus

This is essentially a northern form although it is said to range southward to the Mediterranean in Europe and to Georgia along our Atlantic coast. It was recorded from the Talbot formation of Wailes Bluff in Maryland, and more recently from Yonges Island, S. C., by Mansfield. The present record is based upon poorly preserved material and is therefore tentative. It is somewhat smaller than the figured specimen from Wailes Bluff. Linnaeus' type was the thin shell of the brackish waters of the Baltic.

Galls

Gall scales similar to those figured from the Pamlico formation of the District of Columbia[11] are not uncommon at the present locality.

ZOOLOGY.—*A new crawfish from Florida.*[1] HORTON H. HOBBS, JR., University of Florida. (Communicated by MARY J. RATHBUN.)

The first specimens of this crawfish, a male (Form I) and three females, were collected by Professor J. S. Rogers and myself in April, 1935, from a pine flatwoods four miles northwest of Blountstown, Calhoun Co., Florida. Dr. Waldo L. Schmitt, of the U. S. National

[8] BERRY, E. W. U. S. Geol. Survey Prof. Paper 140: 115, pl. 57, fig. 6, 1926.
[9] BERRY, E. W. This JOURNAL 23: 20, figs. 53, 54, 1933.
[10] MANSFIELD, W. C. U. S. Geol. Survey Prof. Paper 150-F, 1928.
[11] BERRY, E. W. This JOURNAL 23: 24, figs. 72–77, 1933.
[1] Received November 16, 1937.

Museum, examined these specimens for me and stated that they are closely related to the members of the first section of Ortmann's first group,[2] Faxon's Group II,[3] although differing in one or another point from all known species.

In April, 1937, I collected two males (Form I), two males (Form II) and one female from the same locality. One of the Form I males is the holotype (U.S.N.M. cat. no. 75120) and the female the allotype (U.S.N.M. cat. no. 75121). From two miles further north I succeeded in taking five males (Form I), one male (Form II), and three females from the same habitat.

Because of Professor Rogers' interest in crawfishes and the aid and encouragement he has given my work on these animals, I take pleasure in naming this species for him.

Cambarus rogersi, n. sp.

Holotypic male (*Form I*).—Body stocky, thickened dorso-ventrally, compressed laterally. Abdomen much narrower than cephalothorax.

Carapace subovate. Width of carapace slightly greater than depth in region of caudo-dorsal margin of cervical groove. Greatest width of carapace about midway between cervical groove and caudal margin of cephalothorax. (Fig. 4)

Areola linear, almost obliterated, depressed, more than half as long as cephalic section of carapace; a single row of punctations present along fusion line of branchiostegites; sides parallel for a short distance in middle.

Rostrum somewhat broad-lanceolate; apex not reaching distal end of second joint of antennule peduncle; upper surface punctate, excavate, with margins elevated, gradually tapering off towards the apex; no lateral spines present. Apex of rostrum directed ventrad, the extreme apex abruptly bent upward. Cephalic region, in lateral aspect, evenly rounded. Postorbital ridges extending caudad more than half the distance between apex and cervical groove.

Surface of carapace punctate; granulate laterally anterior to cervical groove. No lateral spines present. Cephalo-lateral margins each with one spine near anterior extremity of cervical groove.

Abdomen shorter and narrower than carapace. Anterior section of telson with one spine in each of the postero-lateral angles.

Anterior margin of epistoma irregularly semi-circular; without median anterior projecting spine or point; almost as long as wide.

Antennules of the usual form—a spine present on ventral side of basal segment of the right.

Antennae extending slightly beyond caudal margin of carapace when bent backward.

Antennal scale small; extending almost to tip of second joint of peduncle of antennule. Spine on outer margin strong.

First pereiopod very broad and thin, triangulate, with sharp apex. Inner margin of palm with eight regular tubercles in a single row. Both surfaces

[2] Proc. Amer. Philos. Soc. **44**: 98–101. 1905.
[3] Mem. Mus. Comp. Zool. **40** (8): 411. 1914.

of hand partially punctate; both fingers setose. Both fingers with two distinct ridges. Palm with a prominent ridge along articulation with moveable finger. (Fig. 2)

Moveable finger: inner margin excavated near base; dorsal surface with a prominent sub-median ridge extending from base almost to apex. Outer edge studded with four tubercles along proximal third; remaining distal two-thirds with about eight setiferous punctations. Inner margin broken by two major tubercles; one about midway of the proximal third; the other just distad to middle. The excavated region between the major tubercles with one or two smaller tubercles; distad of the distal major tubercle, the margins with minute denticles. Apex sharply pointed and curved laterad toward the tip of immoveable finger; when the fingers are brought together the moveable finger passing beneath the immoveable finger extends slightly laterad of its lateral margin.

Immoveable finger: outer edge trough-like or punctate, studded with hairs; a few tubercles present along outer margin of base. Inner margin broken by one major tubercle which, when the fingers are closed, is about half-way between the major tubercles of moveable finger. Three or four smaller tubercles present along proximal half; distal half, as in other finger.

Carpus longer than wide; longer than inner margin of palm of chelae, with a deep longitudinal groove above; punctate, three tubercles on distad border of inner surface directed forward terminating in sharp spines. Also smaller proximal spines on inner margin.

Merus smooth except on lower side which has a row of very small tubercles (about eleven) on outer margin; a row of larger ones on inner margin (nine on left, ten on right).

Ischiopodite of third pereiopods hooked; hooks strong, long; caudo-ventral surface rounded; cephalo-dorsal surface excavate. (Fig. 6)

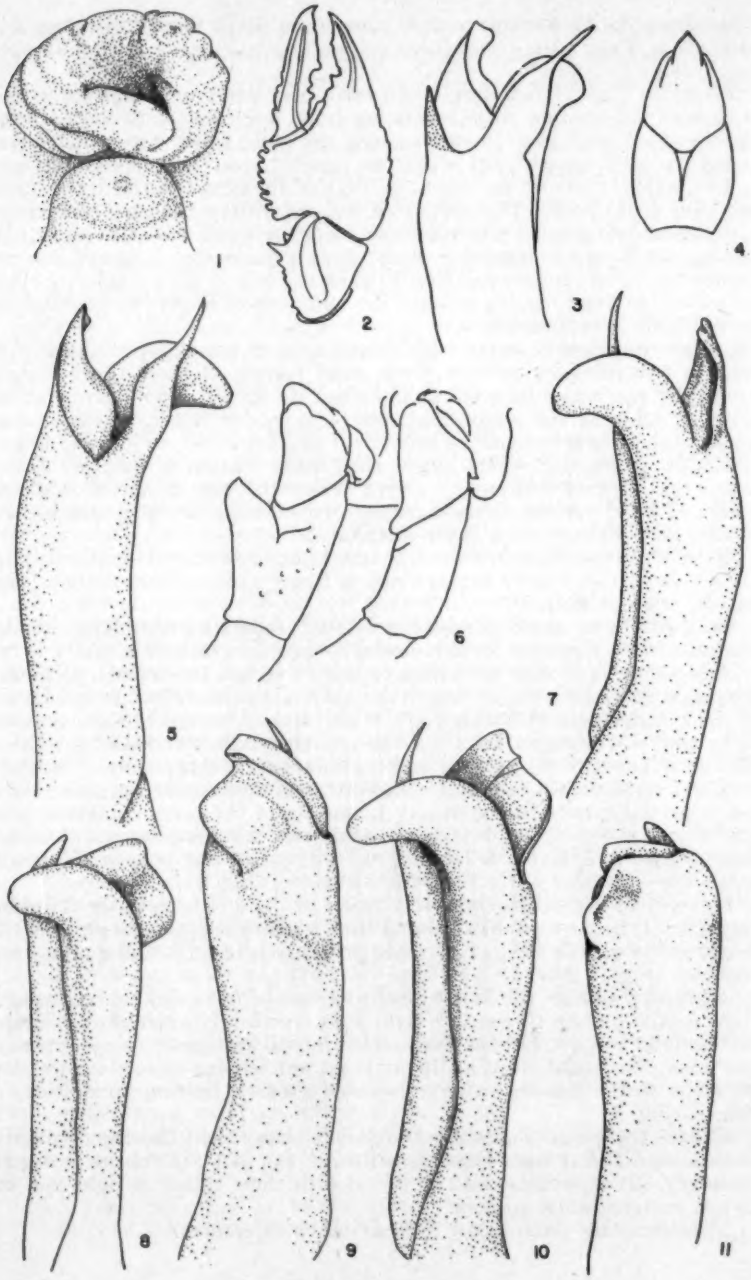
First pleopods of male extending to base of second pereiopods; distinctly separated at the tips; tips ending in three distinct parts. The outer, recurved at right angles with the main shaft, is also turned inward to form the posterior part of the organ. It is the heaviest and most rounded of the three. The inner one extends forward and terminates in a sharp spine. The third terminal consists of a flat, thin plate-like structure on the anterior side of the appendage extending ventrally to the tip of the inner spine and bent laterally at about a forty-five degree angle and extending beyond the main shaft. (Figs. 5, 7, 9, 10) A fourth process is sometimes present as a small spine meso-cephalad of the plate-like structure. (Fig. 3)

Male (Form II).—Differs from the male of the first form in the following respects: (1) hooks on ischiopodite of third walking legs greatly reduced, (2) first pleopod with no horny tips, three processes present but all rounded and reduced. (Figs. 8 and 11)

Allotypic female.—Annulus ventralis moveable; fossa sinking beneath the right caudal margin (observer's right with crawfish lying on dorsal surface and anterior end away); cephalad and left lateral walls gently sloping toward the fossa; the caudal, overhanging it; right wall sloping more abruptly. Just posterior to the annulus, a large rounded tubercle bearing punctations or ridges. (Fig. 1)

Besides the sexual characters the female shows the following distinctive structures differing from those described in the male: (1) chelae not quite as heavy, (2) cephalic section of telson with three spines in right and one in left postero-lateral corners.

Measurements given below indicate other differences.



(Legend on bottom of page 65)

Measurements.—The holotype: carapace, height 1.3, width 1.4, length 2.79; areola, linear, length. 1.11; rostrum, length 0.44, width 0.41; abdomen, length 2.69; left chela, inner margin of palm 0.6, width of palm 1.06 length of outer margin of hand 1.93, moveable finger 1.14; carpopodite of 1st pereiopod, length 0.75, width 0.63 mm. The allotype: carapace, height 1.24, width 1.32, length 2.58; areola, linear, length 1.02; rostrum, length 0.4, width 0.4; abdomen, length 2.31; left chela, inner margin of palm 0.52, width of palm 0.94, length of outer margin of hand 1.62, moveable finger 0.99; carpopodite of 1st pereiopod, length 0.78, width 0.57 mm.

Type Locality.—Low pine flat-woods four miles north of Blountstown on State Highway no. 6. Pitcher plants (*Sarracenia psittacina* Michx. and *Sarracenia drummondi* Croom) and grasses made up the dominant flora. The soil was a sandy clay mixture. All the crawfish were taken from complex burrows ranging from one to three feet deep and with several passages. The water table was about one foot below the surface and the crawfish were always below it—usually at the end of one of the several tunnels. The burrows were numerous and easily located as each was marked by a neat mound of carefully piled pellets. These so-called chimneys were usually four to six inches high. Living in the burrows with the crawfish were other crustaceans: a few white isopods, *Asellus* species; several amphipods, *Eucrangonyx gracilis* (Smith), determined by Mr. Joel Martin; and quite a number of copepods.

The male holotype (Form I), the female allotype and a male paratype (Form II) are deposited in the collections of the United States National Museum. The paratypes: A male (Form I) and a female have been deposited in the Michigan Museum of Zoology; a male (Form I) and a female in the Museum of Comparative Zoology; a male (Form I) and a female in the Carnegie Museum; four males (Form I), two males (Form II) and three females I have retained in my personal collection.

Relationships.—*Cambarus rogersi* probably is more closely allied to the species of Faxon's Group III, namely: *Cambarus bouvieri, simulans, gracilis, hagenianus,* and *advena.* Structurally, *C. rogersi* has its closest affinities with *C. advena;* the chelae of the two forms are strikingly similar. On the other hand, *C. hagenianus* is the only species of this group in which the areola is obliterated. The first pleopods of *Cambarus rogersi* are distinct from all known species and suggest no very close affinities to any of the species mentioned.

FIG. 1.—Annulus ventralis of female (Allotype). Fig. 2.—Dorsal view of right chela (Holotype). Fig. 3.—Diagram of tip of 1st pleopod (male) showing the fourth process which is sometimes present (Fourth process stippled). Fig. 4.—Dorsal view of carapace. Fig. 5.—Mesal view of the 1st pleopod (Holotype). Fig. 6.—Ischiopodites of the 3rd and 4th pereiopods showing heavy hook on the 3rd (Holotype). Fig. 7.—Lateral view of the 1st pleopod (Holotype). Fig. 8.—Caudal view of the 1st pleopod of male (Form II). Fig. 9.—Cephalic view of the 1st pleopod (Holotype). Fig. 10.—Caudal view of the 1st pleopod (Holotype). Fig. 11.—Cephalic view of the 1st pleopod of male (Form II). The pubescence has been removed from all 1st pleopods.

ENTOMOLOGY.—*Three Japanese beetles of the genus* Serica *Macleay.*[1] EDWARD A. CHAPIN, U. S. National Museum.

In 1927, a few specimens of a *Serica*, obviously not a described American species, were taken by Mr. H. C. Hallock at Westbury, L. I. In succeeding years additional specimens were found at the same locality. The species was erroneously determined in 1928 as *Serica similis* Lewis and has appeared in the recent literature under that name. It was later also erroneously determined as *Serica brunnea* Linn. and has been so recorded in print. Doubt was cast on the specific determination of the form in 1936 and specimens of two related species were sent to the British Museum for comparison with Lewis' type. Word came from Mr. G. J. Arrow that neither of the two species sent agreed with the type of *S. similis*. Two specimens from the type series of *similis* were kindly loaned the writer for study; one of these was believed by Mr. Arrow to be the same as the type, the other apparently different and perhaps the Long Island form. Mr. Arrow also supplied a pencil sketch of the aedeagus of the type for further assistance.

The dissection of the two specimens from the British Museum type series shows that they belong to two species, one of which is *S. similis* Lewis, and the other a species different from both *similis* and the Long Island form. Further search of the National Museum collection yielded a single male collected at Yokohama by Kobayashi that is undoubtedly the same as the Long Island species, which fact tends to establish the original habitat of the Long Island species as Japan. There are, therefore, at least three Japanese species which have been confused under the name *Serica similis* Lewis.

Serica similis Lewis

Serica similis Lewis, 1895, Ann. Mag. Nat. Hist., Ser. 6, vol. 16, p. 391.

Male: Elongate subparallel, not strongly convex above. Color medium dark brown with frons and vertex nearly black. Clypeus strongly shining, sides straight and convergent anteriorly. Notches between clypeus and labrum not evident. Labrum bilobed with median angulation broad and moderately deep. Surface of head moderately coarsely and rather sparsely punctured. Antennae 9-segmented, the three segmented club more than three times as long as the five preceding segments combined. Eyes relatively large and convex. Pronotum a little more than twice as wide as its length along median line, posterior angles rounded, anterior produced and acute, lateral margins evenly curved. Surface slightly more densely and coarsely punctured than frons. Scutellum elongate triangular with punctation similar to that of pronotum. Elytra each with nine well impressed grooves which are

[1] Published by permission of the Secretary of the Smithsonian Institution. Received December 22, 1937.

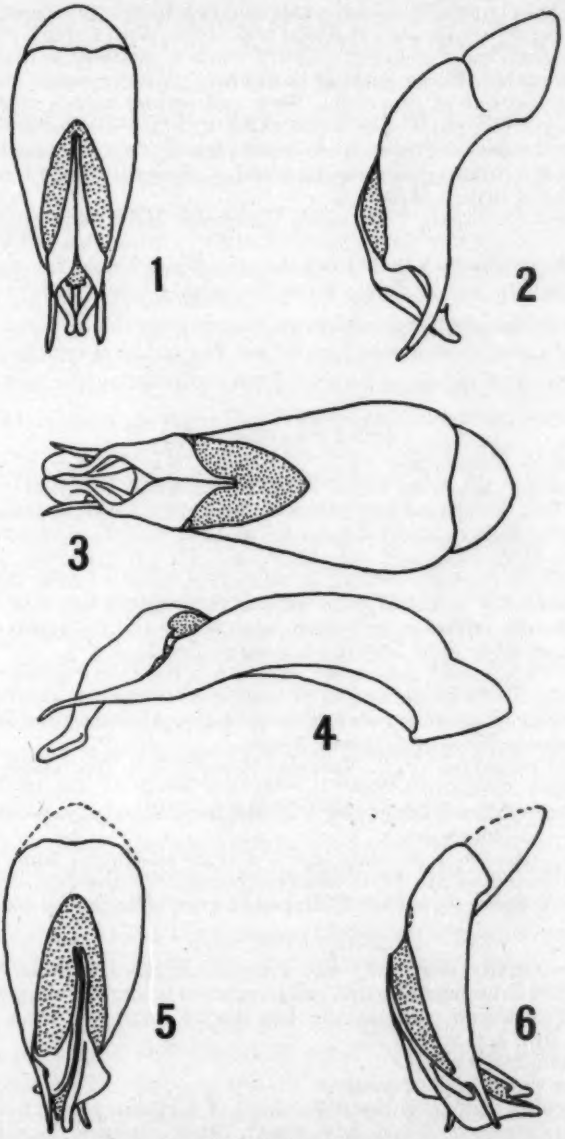


FIG. 1.—*Serica similis* Lewis. Aedeagus, dorsal view. Fig. 2.—*S. similis* Lewis, idem, lateral view. Fig. 3.—*S. peregrina*, n. sp., idem, dorsal view. Fig. 4.—*S. peregrina*, n. sp., idem, lateral view. Fig. 5.—*S. lewisi*, n. sp., idem, dorsal view. Fig. 6.—*S. lewisi*, n. sp., idem, lateral view.

finely and densely punctured, intervals convex without punctures, epipleura narrow, abruptly terminated at apical truncation, with a single row of short setae. Pygidium subtriangular, slightly convex, coarsely and moderately densely punctured. Under parts of thorax and posterior coxae with punctation similar to that of pronotum. First and second visible sternites with transverse, median patches of setae, third with a few setae at middle. In addition to the dense patches, each sternite has a single row of setae extending to lateral margins. Aedeagus, figures 1, 2. Length: male 8.5 mm.

Type: in the British Museum.

Type locality: Japan, "Nagasaki, Hitoyoshi, Nikko and on the Wadatogé."

Material examined: A male from the type series loaned for study by the British Museum. The specimen bears the locality label "S. Japan" only.

The Hitoyoshi specimen has been withdrawn from this species and is made the type of a new species described below. The Nikko specimen is probably also different from *similis* as it comes from the mountainous part of Nippon Island.

Serica peregrina, n. sp.

Serica brunnea Waterhouse, 1875, Trans. Ent. Soc. London, p. 101 in part (synonomy according to G. J. Arrow in letter to writer); Schaeffer, 1931, Bull. Brooklyn Ent. Soc., vol. 26, p. 176 (not *S. brunnea* L. 1758).

Serica similis Hallock, 1929, Journ. Econ. Ent., vol. 22, p. 299; Sim, 1932, Journ. N.Y. Ent. Soc., vol. 40, p. 381, Pl. 15; Schaeffer, 1932, Bull. Brooklyn Ent. Soc., vol. 27, p. 50 (not *S. similis* Lewis 1895).

Male: externally essentially the same as *S. similis* Lewis. Coloration pale yellowish brown, sides of pronotum less curved and with anterior angles usually perceptibly more abrupt. Aedeagus, figs. 3, 4.

Female: more robust than male. Eyes proportionately smaller, antennal club shorter, not twice as long as preceding five segments combined. First visible sternite alone with patch of dense setae. Anterior tibia less slender.

Length: male 8–8.5 mm, female 9 mm.

Type and paratypes: U. S. National Museum Cat. No. 52294, paratypes in the British Museum.

Type locality: Long Island, N. Y. (type from Westbury, paratypes from Westbury and Douglaston).

Material examined: 40 male and 5 female specimens from the above locality, collected by Mr. H. C. Hallock during June and July. Also a single male from Yokohama, Island of Nippon, Japan, collected by Kobayashi.

Serica lewisi, n. sp.

Male: externally essentially the same as *S. similis* Lewis. Coloration paler, yellowish brown with frons and vertex only slightly darker than rest of body. Punctation of pronotum less deeply impressed than in *similis*. Aedeagus, figs. 5, 6.

Length: male 8.5 mm.

Type: in the British Museum.

Type locality: Japan Hitoyoshi, Island of Kyushu, May 15–17, 1881.

Material examined: A male from the G. Lewis collection, loaned for study by the British Museum (withdrawn from the type series of *S. similis* Lewis).

While externally similar to the two preceding species, the aedeagus of this species is asymmetrical and in this respect quite different from either.

ENTOMOLOGY.—Specularius erythrinae, *a new bruchid affecting seeds of* Erythrina (*Coleoptera*).[1] JOHN C. BRIDWELL, U. S. National Museum. (Communicated by C. F. W. MUESEBECK).

When some future philosopher assembles data for the psychology of the color red he may well consider the brilliant red flowers and beans of *Erythrina* which have attracted the attention of men of all races. Few plants encountered by visitors in the tropics are so admired and the literature of botanical exploration is full of tributes to these glorified bean plants grown large, often of tree size, the leafless branches adorned with masses of red or near-red flowers. Aztecs, Negroes, Hindoos, Hawaiians, and Australian blacks have had a lively interest in the species in their own countries and, finding many uses for these plants and their products, have distributed some of them in cultivation far from their original homes. The botanists distinguish some thirty species of *Erythrina*. Three of these occur in the warmer parts of the United States. One, *Erythrina herbacea* Linnaeus, is a perennial herb found from North Carolina to Texas, bearing long racemes of scarlet flowers, each itself two inches long, succeeded by pods containing brilliant scarlet beans, in form not unlike kidney beans. Torrey and Gray report, on the authority of Dr. Boykin, that its irregular branched rootstock is esculent and it is reported that the roots of some tropical American species are eaten. The flowers and tender leaves of some species are used as salad or as cooked vegetables. The flower buds of one species are boiled and eaten with meat. Wilson Poponoe[2] found that the large seeds of *Erythrina edulis* Triana form an important article of food for the Indians of certain mountainous regions of Colombia and praised the flavor of the dish prepared in their manner. Most species, however, are reputed to contain dangerously poisonous substances in seeds and bark. The seeds of some are used to poison rodent pests and the bark serves as a fish poison. Poisonous substances have been isolated from some species and named but this work needs to be repeated with modern methods and their reputed medicinal properties require investigation for acceptance. The flowers and bark are said to yield dyes and the bark a useful fiber. The light, soft, easily-worked wood serves many uses, for temporary posts and firewood, and in making corks, toys, images of saints, light boxes, lacquer ware, scabbards, shields, wooden dishes, water troughs and canoes. The Australian blacks dragged the light

[1] Received January 5, 1937.

[2] WILSON POPONOE, 1923, in Bur. Plant. Ind. Inventory of Seeds and Plants Imported 64: 89–90, no. 51357.

unworked logs into the water to use in crossing creeks and rivers. The branches are usually armed with stout sharp prickles and readily strike root when thrust into the ground. Hence they are often used for hedges to protect garden plots. Being legumes with root nodules supporting nitrogen-fixing bacteria they have soil-improving properties, discovered long before the reason became apparent. Hence, in spite of the brittle nature of the branches, which lessens their value, they have come to be used to a considerable extent for shade for coffee, tea, cacao, and the *Areca* palm and as support for the vines of the true pepper. Although generally considered poisonous the seeds are widely used for necklaces and other ornamental purposes and in children's games and in games of chance by their elders. But, perhaps more generally than for any other reason, they are grown as ornamental trees because most of the human race is fond of the color red.

While working on the biology of Bruchidae in Hawaii I encountered two species of *Erythrina*. One is a native species not found elsewhere, the wili-wili tree, *Erythrina monosperma* Gaudichaud. This tree is often frequented by *Caryedon fuscus* (Goeze), formerly called *Caryoborus gonagra* (Fabricius), many adult beetles hiding by day in the partially opened pods. I have seen hundreds of eggs laid upon the seeds but not one larva was able to develop within them. The Indian coral-tree, *Erythrina variegata* Stickman, formerly known as *E. indica* Lamarck, is a common ornamental tree and its seeds were obtained in quantity for experiment. Most of the species of Bruchidae available deposited their eggs upon the seeds in confinement but none could develop within them, as was anticipated in both cases because of the reputed poisonous nature of the seeds.

In September 1920, W. S. Fisher, our well known specialist in Buprestidae and Cerambycidae, was serving temporarily as inspector for the Federal Horticultural Board and intercepted the first examples of a bruchid affecting the seeds of an *Erythrina*. This was an undetermined species collected by Dr. H. L. Shantz, of the Bureau of Plant Industry with the Smithsonian Expedition at Chuka, Kenia Province, under the equator far in the interior of British East Africa. This insect could not then (or now) be referred to any described genus or species and is described here as *Specularius erythrinae*, in allusion to the mirror-like area on the pygidium and to the host-plant in the seeds of which it develops.

While in India I was surprised to find the same species in December 1924 affecting the seeds of *Erythrina variegata* in the suburbs of Bombay on the island of Salsette and learned something of its habits. It

was also found in Savantvadi State, some fifteen miles inland from the port of Vengurla in British India along the heavily traveled highway leading up to Belgaum in the interior; and at Mormugao Harbor in Goa, Portuguese India, a few miles away; and again down the coast at Mangalore, a port of British India. Upon returning to America in 1927 I found in the National Museum one lot of the species intercepted in the seeds of *E. abyssinica* Lamarck (*E. tomentosa* R. Brown) from Amani, Tanga, Tanganyika Territory, and another taken from the seeds of an undetermined *Erythrina* at Sabang, Pulu We Island, on the north coast of Sumatra, by David Fairchild and P. H. Dorsett of the Bureau of Plant Industry, while accompanying the Allison V. Armour expedition into that region. Subsequently the species has been intercepted by inspectors of the Bureau of Entomology and Plant Quarantine, mostly in the seeds of *Erythrina abyssinica* from various east and south African localities. I know of no records of the seeds of *Erythrina* being attacked by other Bruchidae or by this species in Australasia or America, nor has this species been known to attack other legumes.[2a]

Specularius, n. gen.

The most conspicuous character of *Specularius* is the dark brown, glabrous, highly polished, mirror-like, circular area, occupying the greater part of the plane, sub-vertical pygidium in both sexes, elsewhere found only in the Brazilian *Gibbobruchus speculifer* (Gyllenhal), another member of the Bruchidae, Bruchinae, believed to be not closely allied to *Specularius*.

Type of the genus, *Specularius erythrinae*, n. sp.

Specularius erythrinae, n. sp.

Brownish-red with suffused darker, or piceous-black, areas on the head antennae, pronotum, elytra, breast, hind coxae, femora beneath, some of the sternites, and pygidium; densely pubescent with coarse appressed hairs (often abraded) concealing the sculpture except for naked or partly naked areas on elytra, hind coxae, and pygidium; this pubescence is tawny, varying to whitish in maculate areas, and darker (blackish) on the darker elevated areas of pronotum and elytra; with large coarse punctures and coarse micro-sculpture, very irregularly disposed.

Head short with short malar space; eyes moderately granulate, strongly convex and strongly projecting, emarginate for about two thirds of their length; front strongly carinate, separating the eyes at the clypeus by a little more than the width of their upper lobe; temples abruptly declivous to the contraction; antennae about half as long as the body, a little stouter and more expanded in the male, pubescent, compressed, expanded and serrate,

[2a] Note added in proof: Since this paper was written a brief note has appeared in Proc. Hawaiian Ent. Soc. 9: 368, 1937, saying: "Mr. D. T. Fullaway mentioned having reared . . . *Bruchus pruininus* from *Erythrina* seeds from the Waianae Mts." It may be that these beetles were hidden in the pods. My experience with *B. pruininus* would lead me to doubt its being able to develop in *Erythrina* seeds.

beginning with the 5th joint; 1st and 4th joints subequal in length and breadth; 2nd and 3rd joints shorter, similar to each other, about as long as broad; 5th broader than 4th, its apical angle a little produced; 6th–10th similar to each other, narrowed to base, the inner angle strongly produced, these joints about as long as broad; 11th narrowly ovate, subacute at apex.

Pronotum conical, its sides nearly straight, converging anteriorly to a little more than one third of basal width, with very uneven surface, with a median longitudinal elevation obsolescent in the middle and not strong anteriorly, divided by a median longitudinal sulcus strong on the basal lobe, obsolete in the middle, visible anteriorly, together forming four elevations of which the basal pair are much stronger, outside these in the middle separated from the basal pair by a depression is another similar elevation on either side; lateral lobes strongly depressed; flanks narrow, vertical, not separated from the dorsum; lateral margin represented by a feeble vestigial carina above the coxa, seen with difficulty when denuded of pubescence; cephalic foramen of prothorax strongly inclined backward below; prosternum a little less inclined, triangular, separating the coxae for two thirds their length; mesosternum truncate at apex, descending below prosternum about as far as its length, overlapping the metasternum obliquely; mesepimeron subtriangular, somewhat acuminate along the meso-metapleural suture, ending remote from the coxal cavity; scutellum small, longer than broad, emarginate and bidentate at apex; elytra broader than pronotum basally, broader in the middle, together somewhat longer than broad, separately broadly rounded at apex and serrulate near the suture, depressed along the suture, striae 2, 4, 6, and 8 slightly interruptedly elevated, the elevations accentuated by the pubescence which is blackish on the elevations, an area on the 2nd, 3rd, and 4th intervals[3] within and behind the humeral calli is most strongly elevated (3rd interval depressed between the strong elevations of 2nd and 4th intervals); striae strongly impressed with strongly impressed punctures; intervals without punctures, more or less transversely rugulose and flat except for the elevations of the alternate intervals (which with the humeral calli are evenly transversely finely ridged); sutural margin in the middle some distance behind the scutellum dark with dark pubescence; denuded elytron irregularly checkered with reddish and blackish, all intervals, margins and the apex bearing some dark markings; 10th stria abbreviate at about the apical third; 4th and 5th striae abbreviate at apex; 2nd, 5th, 6th and 10th striae extending nearer the base than the others; base without tubercles or denticles.

Front and middle legs without special structures of note; hind coxa about as broad as the two sternites next behind it, slightly broader than the femur, with rather coarse piliferous punctures denser in the middle, lateral fourth more densely pubescent, hind margin naked, a narrow densely punctate and pubescent band just before the hind margin extending far toward the insertion of trochanter; hind femur compressed nearly straight beneath for most of its length, gradually arcuately widened above to beyond the middle, then more suddenly narrowed to apex; ventral edge flattened, inner and outer margins of ventral surface subcarinate apically, inner ventral margin emarginate and armed before the emargination with a strong acute suberect tooth and beyond it with one or two small denticles, and before it with one or two feeble serrulations, outer ventral margin with a small rounded con-

[3] The intervals are numbered here from the striae outside which they lie beginning with the stria nearest the suture as stria 1, hence there are nine intervals and sutural and lateral margins on each elytron.

dylar lamina, emarginate before the lamina and subangulate before the emargination; flexed tibia resting between this subangulate process and the great tooth of the inner margin; tibia nearly straight, dorsoventrally widened at apex to about three times its basal width, bearing at apex a strong prorrect acute mucro, nearly as long as breadth of tibia, a shorter triangular lateral tooth, and three small subequal subdorsal teeth; outer face with a ventral longitudinal carina, a less elevated intermediate carina obsolescent at apex where it approaches the base of the mucro and a strong lateral longitudinal carina ending in the lateral tooth; basitarsus more than half as long as tibia, gently arched in the middle, produced into a tooth at apex beneath, with a longitudinal carina on outer and inner faces and a single ventral longitudinal carina; second tarsal joint longer than broad, not expanded apically, feebly longitudinally carinate and produced at apex beneath; lobes of third joint feeble, not expanded; ungues appendiculate.

Abdomen shorter than the breast, not attaining the apex of elytra or of hind femora, three intermediate sternites subequal, each shorter than the first sternite behind the coxa and longer than the fifth in the male, shorter in female; pygidium flat nearly vertical, broadly triangular, bearing on the disc a large polished, reflecting area surrounded by a border of whitish pubescence concealing the surface; this area is dark brown with some irregularly disposed, strongly impressed punctures arranged in a marginal series with others scattered within; male pygidium slightly reflexed at apex and subtruncate, with another tergite visible between pygidium and narrowed fifth sternite.

Length from anterior margin of pronotum to apex of elytron 2.6–4 mm; width 1.75–2.8 mm.

Described from a type series in the United States National Museum of 52 ♀s and 33 ♂s, with accompanying material showing eggs, pupae, work in host seeds, and dissections. Type no. 52331 U.S.N.M.

Type locality: Amani, Tanga, Tanganyika Territory, East Africa, type male, allotype female and two female paratypes labelled "Amani, Tanga, East Africa on *Erythrina tomentosa* F.H.B. 89143 March 31, '25."

Additional localities and material as follows:

AFRICA: Chuka, Kenia Province, Kenia, 3 ♀s, 1 ♂, and 3 seeds of host plant labelled as from Nairobi intercepted by W. S. Fisher F.H.B. 37623 (Cf. Inventory **65**: 33, 34 no. 51637. From seeds of *Erythrina* sp. collected by H. L. Shantz, June 16, 1920). Amani, (2nd lot), 3 ♀s, 2 ♂s, 3 seeds of host plant labelled "Seed of *Erythrina tomentosa*, 12.X. '28, H. Y. Gouldman, P. Q. & C. A. 7581." South Africa, 5 ♀s, 3 ♂s, 3 seeds of host plant labelled "Ex *Erythrina* from So. Africa, San Francisco, Cal. Jul. 1, '29 G. Wilson." Natal, 2 ♀s, 1 ♂ labelled "Natal, South Africa Sept. '36 coll. R. H. Smith host *Erythrina abys[s]yni[c]a*." Rhodesia, 3 ♀s, 2 seeds of host plant [*Erythrina sp.*] labelled "Wilmore Kentucky Nov. 12, 1937 ex beans from Rhodesia, S. Africa." (One additional female paratype and one seed of host plat were returned to the sender, Lee H. Townsend, University of Kentucky.)

INDIA: Goregaum, Bombay Salsette, 12 ♀s, 9 ♂s, 10 fragmentary adults and dissections from them, 5 cocoons containing adults, 2 empty cocoons, 4 pupae, 9 seeds of host plant (*Erythrina variegata*, labelled *E. indica*, Dec. 1924). Borivli, Bombay Salsette, 12 ♀s, 8 ♂s Jan. 1925. Savantvadi State, 5 ♀s, 5 ♂s, bred from *Erythrina variegata*, labelled *E. indica* April, 1926. Mormugao Harbor, Goa, Portuguese India, 1 ♂ coll. Sept. '25. Mangalore, 1 ♀ coll. Jan. '27. All these bred or collected by J. C. Bridwell.

SUMATRA; Sabang, Pulu We Island, 2 ♀s, 1 ♂ labelled "Sumatra D. Fairchild D.F. 431 (Cf. Inventory **87**: 22. Obtained by David Fairchild and P. H. Dorsett. S.P.I. no. 67182. *Erythrina* sp. No. 431. February 17,1926)."

Dark pubescent spots on the pygidium are not unusual in Bruchidae and glabrous polished areas occur in groups of the Bruchinae otherwise unlike. Such an area occurs upon the pygidium of the female of *Bruchidius stierlini* (Allard), (affecting *Scorpiurus compressus* Linnaeus in the Mediterranean Region), which has been absurdly considered a variety of *Bruchidius seminarius* (Linnaeus). But in this species the area is convex and the pygidium oblique and the insect is otherwise quite unlike *Specularius*. In some American Bruchinae affecting seeds of *Bauhinia* and *Cercis* perhaps referable to *Gibbobruchus* Pic, polished glabrous areas are found on the female pygidium. Our *Gibbobruchus mimus* (Say) breeding in the seeds of *Cercis canadensis* Linnaeus has a cordate glabrous polished area on the female pygidium but this is convex and oblique and femoral characters forbid association with *Specularius*. These femoral characters are found also in *Gibbobruchus speculifer* (Gyllenhal) in which the pygidium is much more like that of *Specularius* and the mirror-like area is present in both sexes. The similarity of structure of hind legs, scutellum and antennae leads me to place these American forms in *Gibbobruchus*. The strongly elevated pronotum which Pic used as the principal character for his group does not run through the genus and in two undescribed species which certainly belong with *mimus*, and probably with *speculifer*, the median longitudinal elevation is so reduced as to be almost imperceptible. In all the species which I should place in *Gibbobruchus* the scutellum is transverse (emarginate and bidentate at apex) and thus unlike the oblong scutellum of *Specularius*. The hind femur expands above and below in similar even opposed curves to the middle and similarly narrows to apex. The flexed tibia is received in a groove on the ventral edge of the femur. The outer margin of this groove is armed with a long series of denticulations or serrulations and the inner margin bears near apex a stout tooth and a series of three or more strong acute denticles beyond it, quite unlike the one or two feeble denticles in the same position in *Specularius*. The tibia is more slender and arcuate and lacks the lateral tooth at appex; the intermediate longitudinal carina is more strongly developed so that the tibia is distinctly sulcate beneath with the inner or ventral carina somewhat more elevated than the outer or intermediate. The basitarsus is not produced into a tooth at apex beneath. In none of them can the antennae be said to resemble those of *Specularius*.

I have thus particularly compared *Specularius* with *Gibbobruchus* since the differences found seem to remove any probability of an American origin for this genus of uncertain nativity. I believe the genus originated in the interior of Africa and was taken to India and Sumatra by inhabitants of India who were employed in Africa and carried back with them the brilliant scarlet seeds of *Erythrina abyssinica* or other species containing the larvae of *Specularius*.

If *Specularius* is of African origin and not closely allied to *Gibbobruchus*, its kin must be sought among Old World Bruchidae without the peculiar pygidial mirror. Pic has established a genus *Callosobruchus* of which *Curculio chinensis* Linnaeus 1758 (= *Bruchus scutellaris* Fabricius 1792 = *Bruchus pecti[ni]cornis* Linnaeus 1767) is the genotype. The callus of the basal lobe of the pronotum was considered by Pic as its distinguishing character but this is found in other genera and is not found in some species which must be placed near *chinensis* because of other characters. As understood by me the genus is represented by many species in the Old World tropics, Africa, southern Asia, and Malaysia. Three of these have been widely distributed in commerce and established in many countries where their favored host plants are grown. These are *C. chinensis*, *C. maculatus* (Fabricius 1775) (= *quadrimaculatus* Fabricius 1792) and *C. phaseoli* (Gyllenhal 1833), all affecting food legumes of Old World origin. Also affecting Old World food legumes but not yet, apparently, established in the Americas are the important economic species *C. analis* (Fabricius 1781), *C. theobromae* (Linnaeus 1767), *C. subinnotatus* (Pic 1914) and other species of still undetermined status. One somewhat aberrant species, *C. ademptus* (Sharp 1886) extends out of the tropics into temperate northeastern Asia affecting the kudzu, *Pueraria thunbergiana* Bentham. Another extra-tropical species, *C. spiniger* (Baudi 1886) is found in Asia Minor and the Eastern Mediterranean Islands, its food plant still unknown. Besides these, numerous species attached to non-economic leguminous host plants are found in tropical Africa, Asia and Malaysia. All these agree in having the hind femur armed beneath near apex within and without with a strong tooth. In *ademptus* only is the outer tooth so reduced as to suggest comparison with the slight subangulate process in the same position in *Specularius*. None of them have any trace of denticles beyond the tooth on the inner margin. In all the basitarsus resembles that of *Specularius* but the ventral carina is double with a narrow sulcus separating the carinae. The mesepimeron is more acuminate along the pleural suture, reaching nearly or quite to the trochantin extension of the mesocoxal cavity and in none of them are the irregularities of the pronotum so fully developed. The elytra lack the irregularities of surface in *Specularius*, the tenth stria is less abbreviate and striae 2, 3, 4, 5, and 6 extend evenly to the base of the elytron. All the species have stronger sex dimorphism than found in *Specularius*, the sexes differing in coloration of elytra and pygidium, in antennal structure, and in form and inclination of pygidium and fifth sternite. Hence it seems to me that *Specularius* must be considered closely allied to *Callosobruchus* but sufficiently unlike to be excluded from the genus.

The pods of the species of *Erythrina* remain for a long time attached to the trees and are only very tardily dehiscent. Being very brittle they become broken by the whipping of the branches in the wind and the seeds become exposed and fall to the ground as the pods open

partially or are broken. It is not until the seeds are exposed that oviposition by *Specularius* takes place and the eggs are laid scattered on the seeds. The eggs resemble those of *Callosobruchus maculatus* being long ellipsoidal and firmly cemented to the seed. The contraction of the cement substance in hardening flattens the egg to an ovate outline with one pole elevated into a peak near one end. The larva enters the seed directly from the egg and develops within the cotyledon, preparing, when full grown, a strong cocoon attached to a window of the seed coat ready to be cut by the adult and pushed loose as a perfect disc when the adult emerges. In the smaller seed of *E. abyssinica* from one to three adults can develop while in the larger seed of *E. variegata* more than a dozen exit holes have been found. The seeds may be reinfested until the entire contents is destroyed. The tardy attack of *Specularius* upon the seeds of *Erythrina* makes it a simple matter to secure uninfested seeds for propagation if the pods are gathered promptly when they become ripe before the seeds are exposed.

However poisonous the seeds of *Erythrina* may be shown to be on further investigation there is nothing surprising in finding a bruchid adapting itself to feeding in poisonous seeds. *Bruchidius villosus* (Fabricius) is not deterred from destroying the seeds of *Cytisus scoparius* by the toxic alkaloid contained in them; the toxalbumen in the seeds of *Abrus precatorius* does not render them unsuitable for food for the larvae of *Caryopemon cruciger* (Stephens) in Africa and *C. lhostei* Pic in Ceylon. The rotenone in seeds of *Cracca virginiana* has no ill effect upon the larva of *Acanthoscelides obsoletus* (Say) and Trelease and Trelease[4] have recently shown that concentrations of selenium in the seeds of *Astragalus* lethal to vertebrate animals may be endured by *Acanthoscelides fraterculus* (Horn).

[4] SAM F. and HELEN M. TRELEASE, 1937, Science 85: 590; and Amer. Jour. Bot. 24: 448–451, f. 1–4.